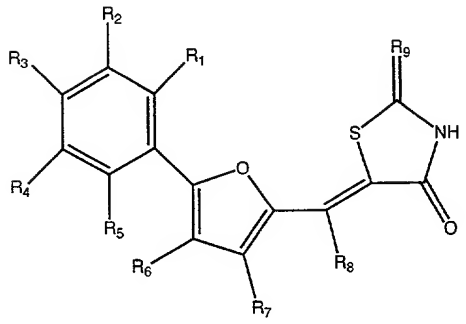
We claim:

1. A compound comprising the formula:



wherein

R_1 to R_8 each independently are selected from the group consisting of H, alkyl, alkenyl, alkynyl, aryl, heterocycle, COOH, COOAlkyl, $CONR_{10}R_{11}$, $C(O)R_{12}$, OH, OAlkyl, OAc, SH, SR_{12}, SO_3H, $S(O)R_{12}$, $SO_2NR_{10}R_{11}$, $S(O)_2R_{12}$, NH_2, NHR_{12}, $NR_{10}R_{11}$, $NHCOR_{12}$, N_3, NO_2, PH_3, PH_2R_{12}, H_2PO_4, H_2PO_3, H_2PO_2, HPO_4R_{12}, $PO_2R_{11}R_{12}$, CN, and X;

R_9 is O, S, or NR_{12}; and

R_{10}, R_{11}, and R_{12} each independently are selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, aryl, and heterocycle, or R_{10} and R_{11} together with the nitrogen to which they are attached can be joined to form a heterocyclic ring;

with the proviso that at least one of R_1 to R_8 is other than hydrogen.

2. The compound of claim 1, wherein at least one of R_1 to R_8 is COOH.

3. The compound of claim 1, wherein at least one of R_1 to R_8 is OH.

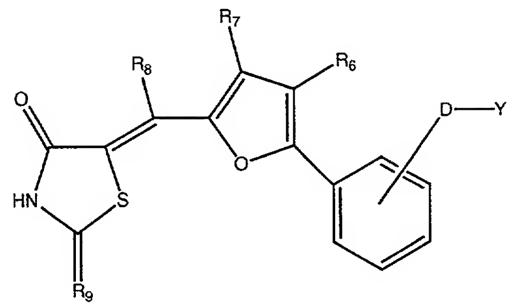
4. The compound of claim 1, wherein at least one of R_1 to R_8 is OAlkyl.

5. The compound of claim 1, wherein at least one of R_1 to R_8 is COOAlkyl.

6. The compound of claim 1, wherein at least one of R_1 to R_8 is $NHCOR_7$.

7. The compound of claim 1, wherein two or more of R_1 to R_8 are substituted.

8. The compound of claim 1, having the formula

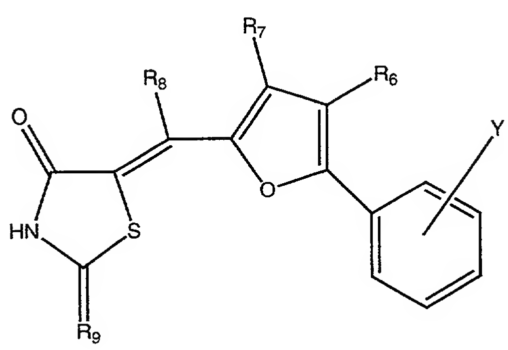


wherein

D is alkylene, alkenylene, alkynylene, aryl, or heterocycle; and

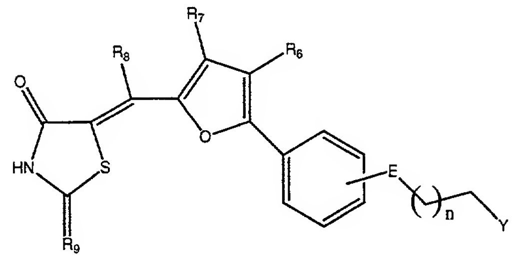
Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

9. The compound of claim 1, having the formula



wherein Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

10. The compound of claim 1, having the formula



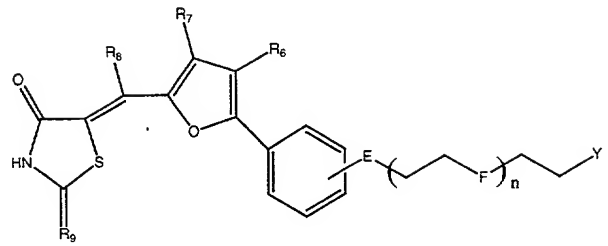
wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH{=}CH_2$; and

n is an integer between 0 and 5, inclusive.

11. The compound of claim 1, having the formula



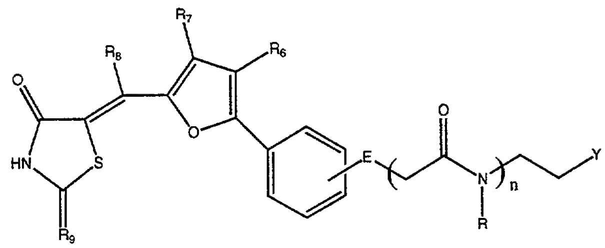
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

12. The compound of claim 1, having the formula



wherein

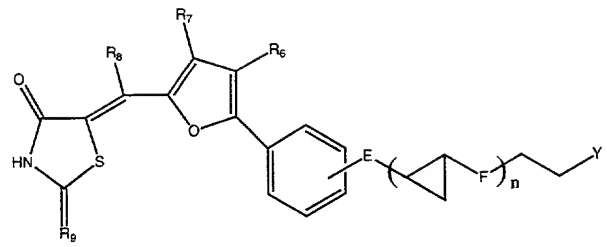
E is O, S, NH, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH{=}CH_2$;

R is hydrogen, alkyl, alkenyl, alkynyl, aryl, or heterocycle; and

n is an integer between 0 and 5, inclusive.

13. The compound of claim 1, having the formula



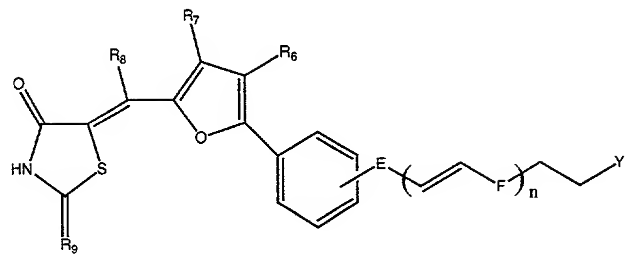
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

14. The compound of claim 1, having the formula



wherein

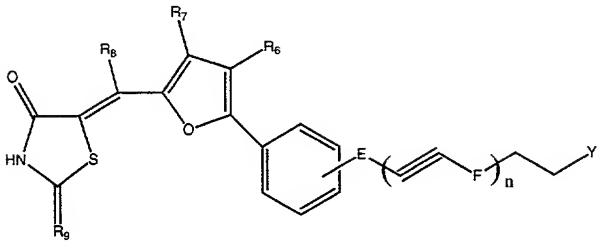
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

15. The compound of claim 1, having the formula



wherein

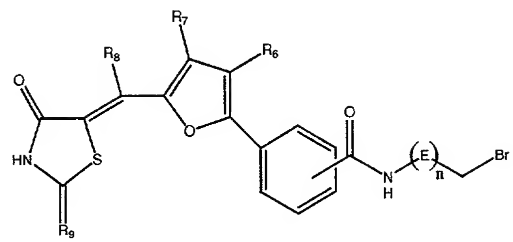
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

16. The compound of claim 1, having the formula

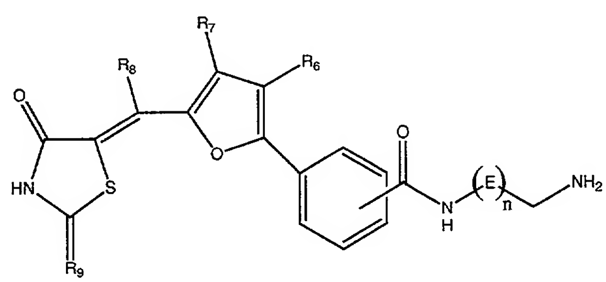


wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH; and

n is an integer between 0 and 5, inclusive.

17. The compound of claim 1, having the formula

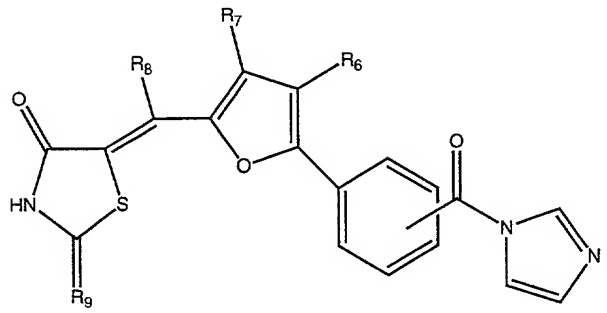


wherein

E is CH_2, CH_2CH_2OCH or CH_2CH_2SCH and n is an integer between 1 and 10, inclusive.

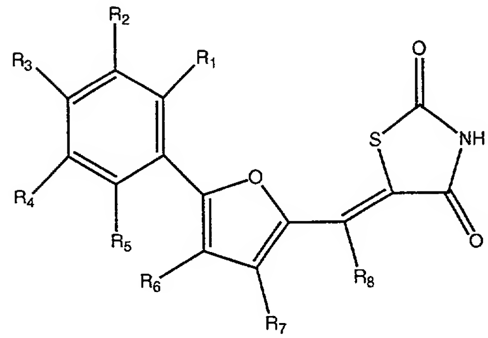
18. The compound of claim 17, wherein n is greater than 4 and E is CH_2CH_2OCH or CH_2CH_2SCH.

19. The compound of claim 1, having the formula



.

20. A compound comprising the formula:



wherein

R_1 to R_8 each independently are selected from the group consisting of H, alkyl, alkenyl, alkynyl, aryl, heterocycle, COOH, COOAlkyl, $CONR_{10}R_{11}$, $C(O)R_{12}$, OH, OAlkyl, OAc, SH, SR_{12}, SO_3H, $S(O)R_{12}$, $SO_2NR_{10}R_{11}$, $S(O)_2R_{12}$, NH_2, NHR_{12}, $NR_{10}R_{11}$, $NHCOR_{12}$, N_3, NO_2, PH_3, PH_2R_{12}, H_2PO_4, H_2PO_3, H_2PO_2, HPO_4R_{12}, $PO_2R_{11}R_{12}$, CN, and X;

R_{10}, R_{11}, and R_{12} each independently are selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, aryl, and heterocycle, or R_{10} and R_{11} together with the nitrogen to which they are attached can be joined to form a heterocyclic ring;

with the proviso that at least one of R_1 to R_8 is other than hydrogen.

21. The compound of claim 20, wherein at least one of R_1 to R_8 is COOH.

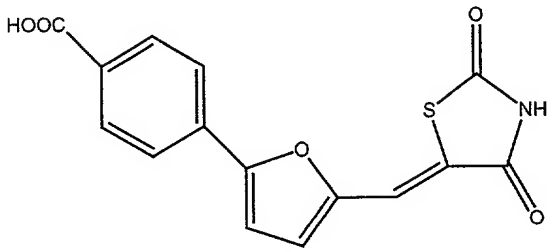
22. The compound of claim 20, wherein at least one of R_1 to R_8 is OH.

23. The compound of claim 20, wherein at least one of R_1 to R_8 is COOAlkyl.

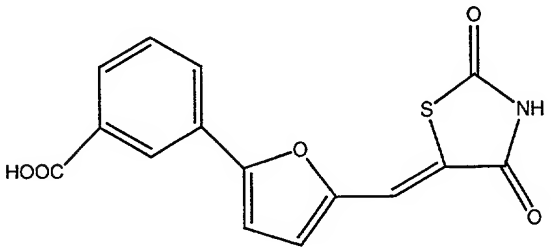
24. The compound of claim 20, wherein at least one of R_1 to R_8 is OAlkyl.

25. The compound of claim 20, wherein two or more of R_1 to R_8 are substituted.

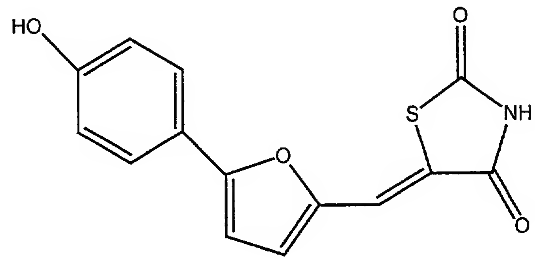
26. The compound of claim 20, having the formula:



27. The compound of claim 20, having the formula:

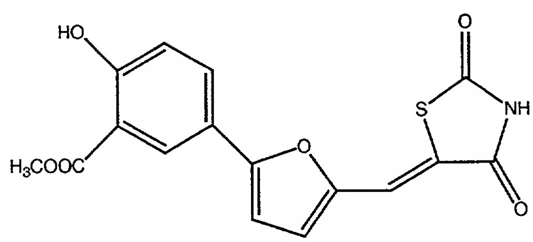


28. The compound of claim 20, having the formula:



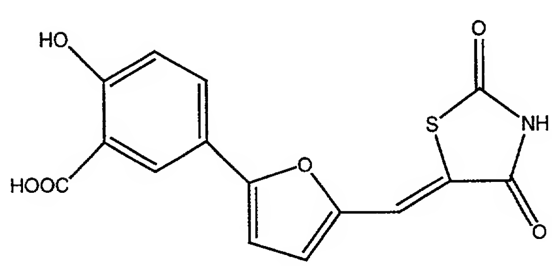
.

29. The compound of claim 20, having the formula:



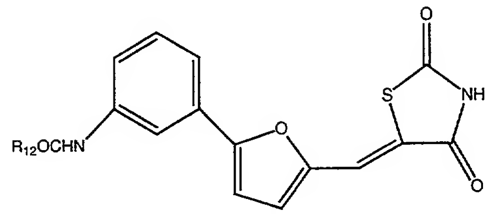
.

30. The compound of claim 20, having the formula:



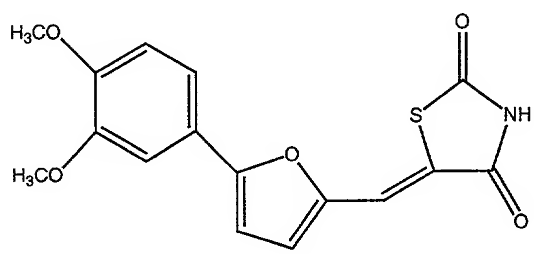
.

31. The compound of claim 20, having the formula:



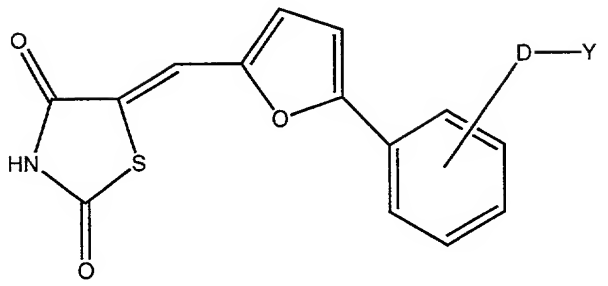
.

32. The compound of claim 20, having the formula:



.

33. The compound of claim 20,having the formula

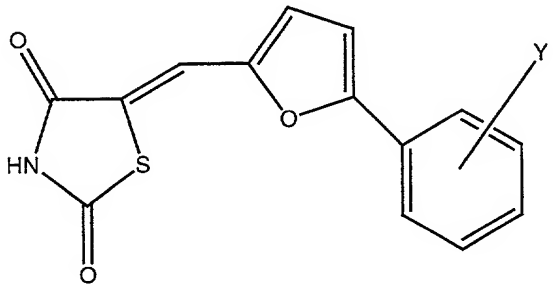


wherein

D is alkylene, alkenylene, alkynylene, aryl, or heterocycle; and

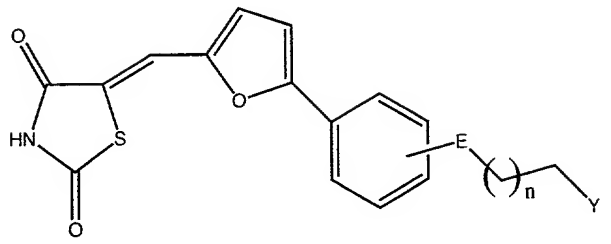
Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

34. The compound of claim 20,having the formula



wherein Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

35. The compound of claim 20,having the formula



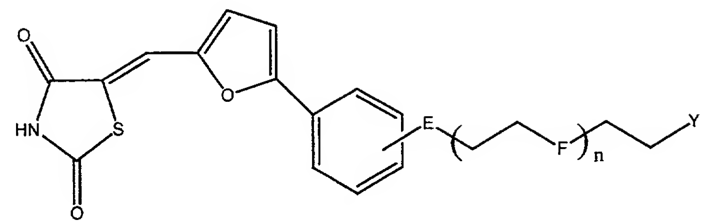
wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

36. The compound of claim 20, having the formula



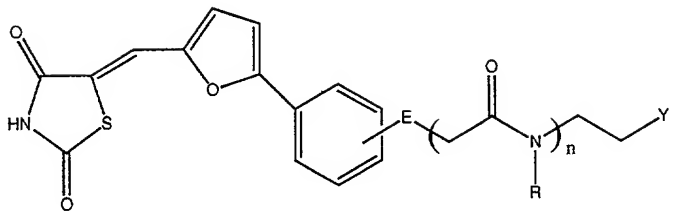
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

37. The compound of claim 20,having the formula



wherein

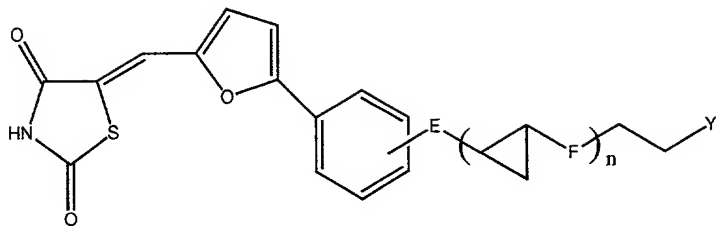
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$;

R is hydrogen, alkyl, alkenyl, alkynyl, aryl, or heterocycle; and

n is an integer between 0 and 5, inclusive.

38. The compound of claim 20,having the formula



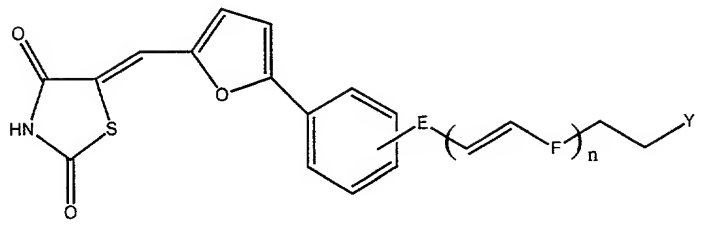
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

39. The compound of claim 20,having the formula



wherein

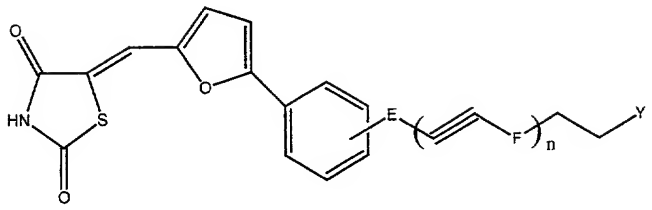
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

40. The compound of claim 20,having the formula



wherein

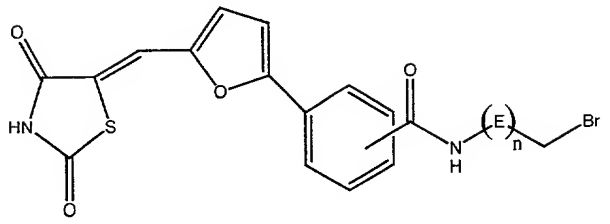
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

41. The compound of claim 20,having the formula

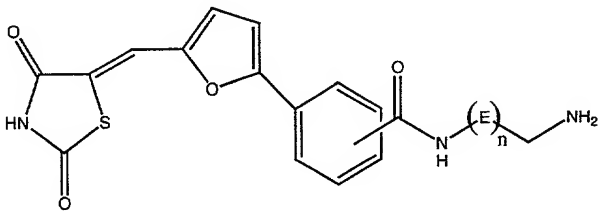


wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH; and

n is an integer between 0 and 5, inclusive.

42. The compound of claim 20,having the formula



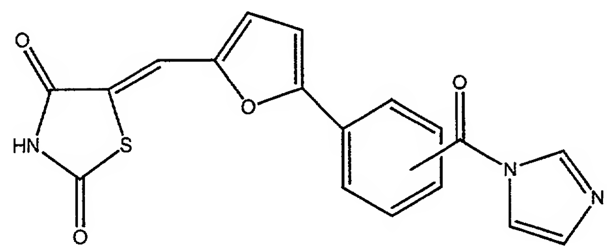
wherein

E is O, CH_2, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH; and

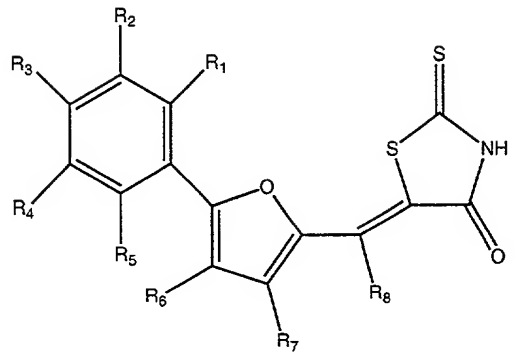
n is an integer between 0 and 5, inclusive.

43. The compound of claim 42, wherein n is greater than 4 and E is CH_2CH_2OCH or CH_2CH_2SCH.

44. The compound of claim 20, having the formula



45. A compound comprising the formula:



wherein

R_1 to R_8 each independently are selected from the group consisting of H, alkyl, alkenyl, alkynyl, aryl, heterocycle, COOH, COOAlkyl, $CONR_{10}R_{11}$, $C(O)R_{12}$, OH, OAlkyl, OAc, SH, SR_{12}, SO_3H, $S(O)R_{12}$, $SO_2NR_{10}R_{11}$, $S(O)_2R_{12}$, NH_2, NHR_{12}, $NR_{10}R_{11}$, $NHCOR_{12}$, N_3, NO_2, PH_3, PH_2R_{12}, H_2PO_4, H_2PO_3, H_2PO_2, HPO_4R_{12}, $PO_2R_{11}R_{12}$, CN, and X;

R_{10}, R_{11}, and R_{12} each independently are selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, aryl, and heterocycle, or R_{10} and R_{11} together with the nitrogen to which they are attached can be joined to form a heterocyclic ring;

with the proviso that at least one of R_1 to R_8 is other than hydrogen.

46. The compound of claim 45, wherein at least one of R_1 to R_8 is COOH.

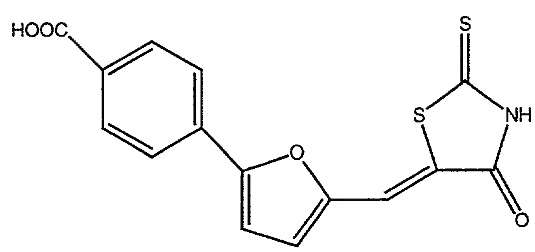
47. The compound of claim 45, wherein at least one of R_1 to R_8 is OH.

48. The compound of claim 45, wherein at least one of R_1 to R_8 is OAlkyl.

49. The compound of claim 45, wherein at least one of R_1 to R_8 is COOAlkyl.

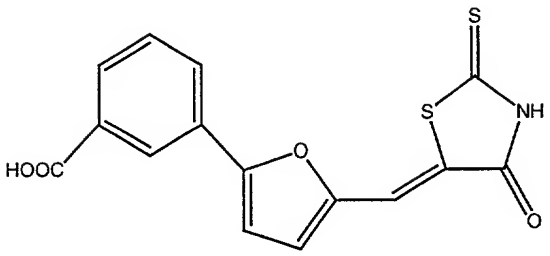
50. The compound of claim 45, wherein at least one of R_1 to R_8 is NHAc.

51. The compound of claim 45, having the formula:

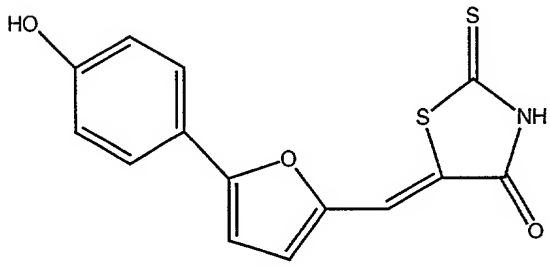


.

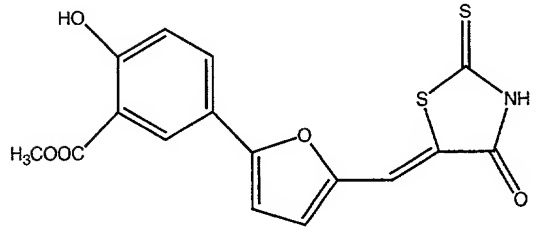
52. The compound of claim 45, having the formula:



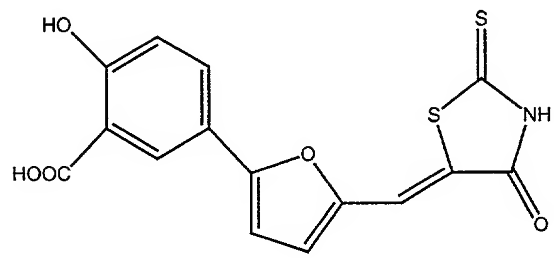
53. The compound of claim 45, having the formula:



54. The compound of claim 45, having the formula:

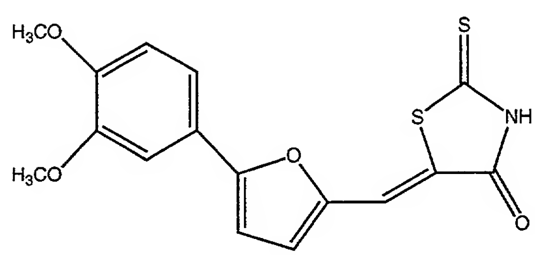


55. The compound of claim 45, having the formula:



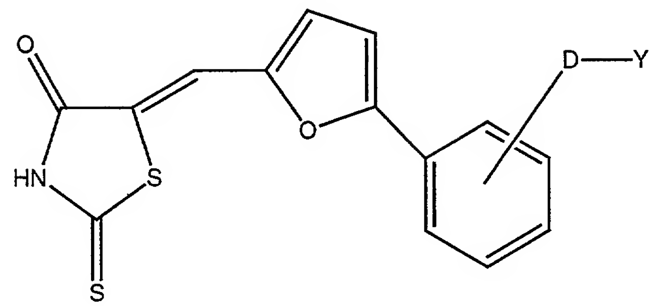
.

56. The compound of claim 45, having the formula:



.

57. The compound of claim 45,having the formula

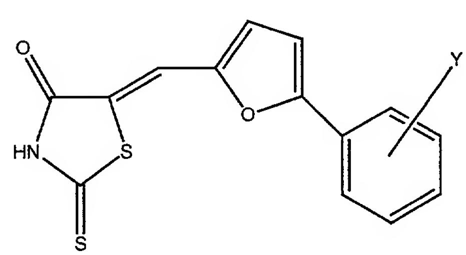


wherein

D is alkylene, alkenylene, alkynylene, aryl, or heterocycle; and

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

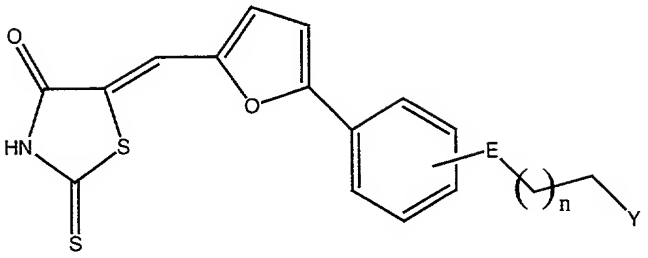
58. The compound of claim 45,having the formula



wherein

wherein Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

59. The compound of claim 45,having the formula



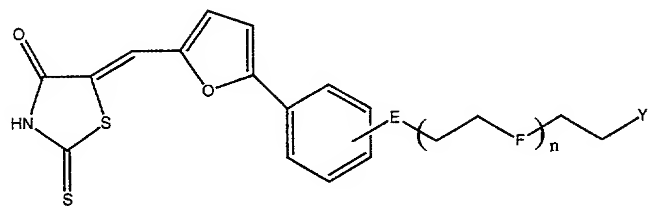
wherein

E is O, S,NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

60. The compound of claim 45, having the formula



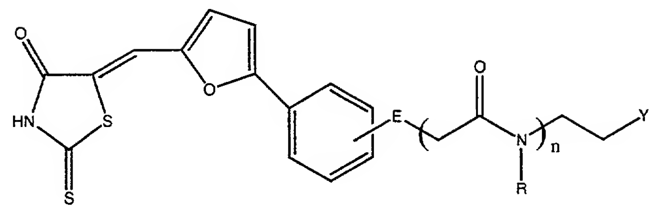
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

61. The compound of claim 45,having the formula



wherein

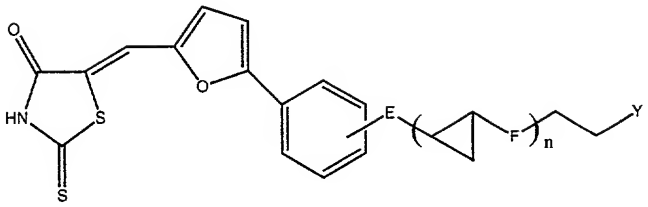
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$;

R is hydrogen, alkyl, alkenyl, alkynyl, aryl, or heterocycle; and

n is an integer between 0 and 5, inclusive.

62. The compound of claim 45, having the formula



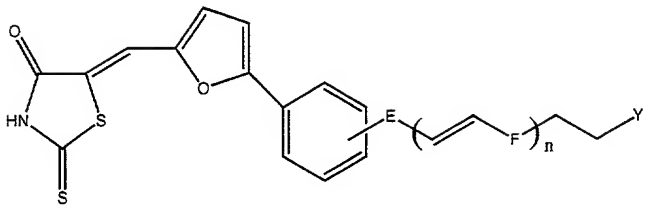
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

63. The compound of claim 45,having the formula



wherein

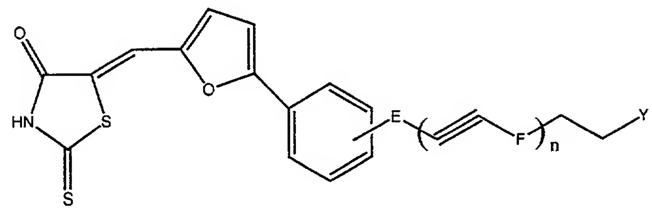
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

64. The compound of claim 45,having the formula



wherein

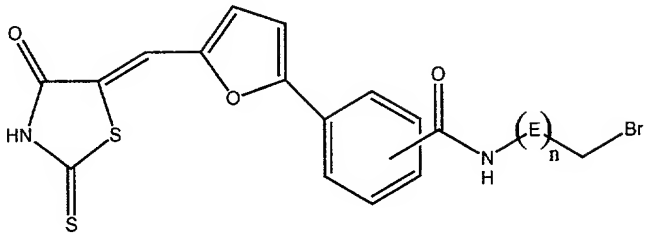
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

65. The compound of claim 45,having the formula

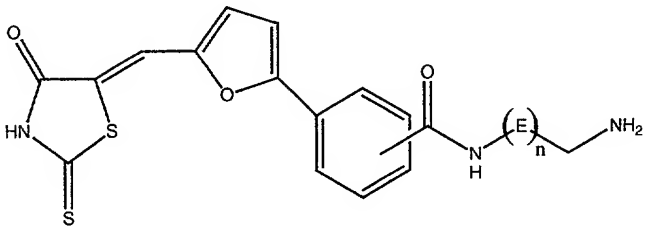


wherein

E is selected O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH; and

n is an integer between 0 and 5, inclusive.

66. The compound of claim 45,having the formula

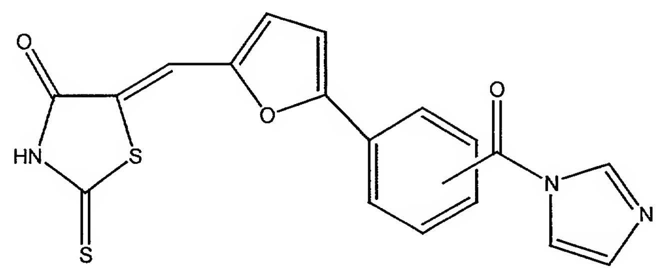


wherein

E is CH_2, CH_2CH_2OCH or CH_2CH_2SCH and n is an integer between 1 and 10, inclusive.

67. The compound of claim 66, wherein n is greater than 4 and E is CH_2CH_2OCH or CH_2CH_2SCH.

68. The compound of claim 45,having the formula



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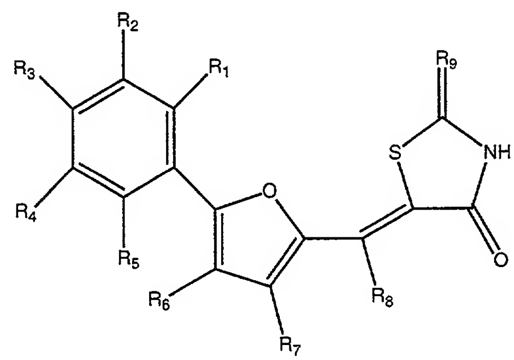
69. A combinatorial library of two or more compounds comprising a common ligand variant of a compound of the formula:



wherein

R_1 to R_8 each independently are selected from the group consisting of H, alkyl, alkenyl, alkynyl, aryl, heterocycle, COOH, COOAlkyl, $CONR_{10}R_{11}$, $C(O)R_{12}$, OH, OAlkyl, OAc, SH, SR_{12}, SO_3H, $S(O)R_{12}$, $SO_2NR_{10}R_{11}$, $S(O)_2R_{12}$, NH_2, NHR_{12}, $NR_{10}R_{11}$, $NHCOR_{12}$, N_3, NO_2, PH_3, PH_2R_{12}, H_2PO_4, H_2PO_3, H_2PO_2, HPO_4R_{12}, $PO_2R_{11}R_{12}$, CN, and X;

R_9 is O, S, or NR_{12}; and

R_{10}, R_{11}, and R_{12} each independently are selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, aryl, and heterocycle, or R_{10} and R_{11} together with the nitrogen to which they are attached can be joined to form a heterocyclic ring.

70. The combinatorial library of claim 69, wherein at least one of R_1 to R_8 is COOH.

71. The combinatorial library of claim 69, wherein at least one of R_1 to R_8 is OH.

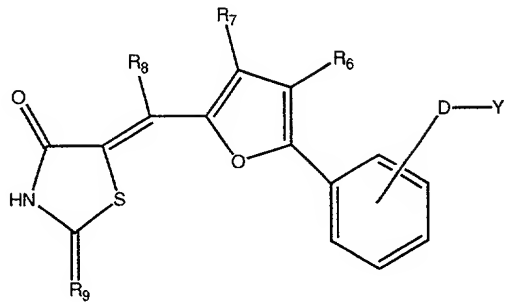
72. The combinatorial library of claim 69, wherein at least one of R_1 to R_8 is OAlkyl.

73. The combinatorial library of claim 69, wherein at least one of R_1 to R_8 is COOAlkyl.

74. The combinatorial library of claim 69, wherein at least one of R_1 to R_8 is $NHCOR_7$.

75. The combinatorial library of claim 69, wherein two or more of R_1 to R_5 are substituted.

76. The combinatorial library of claim 69, having the formula

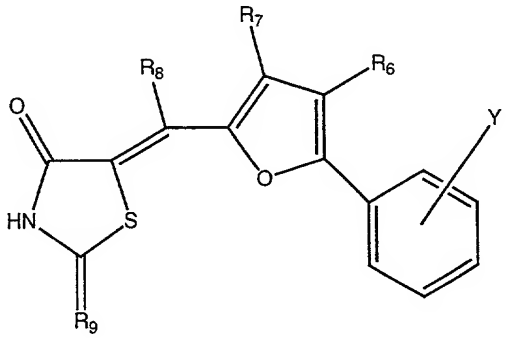


wherein

D is alkylene, alkenylene, alkynylene, aryl, or heterocycle; and

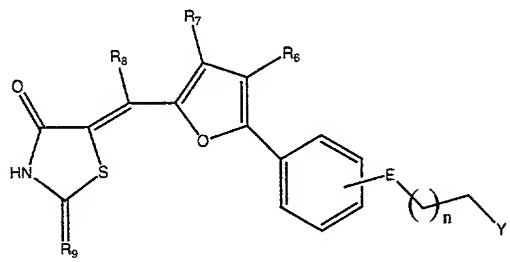
Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

77. The combinatorial library of claim 69, having the formula



wherein Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

78. The combinatorial library of claim 69, having the formula



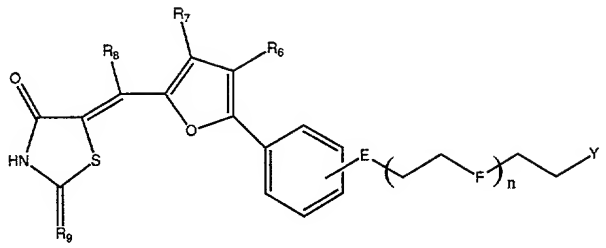
wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

79. The combinatorial library of claim 69, having the formula



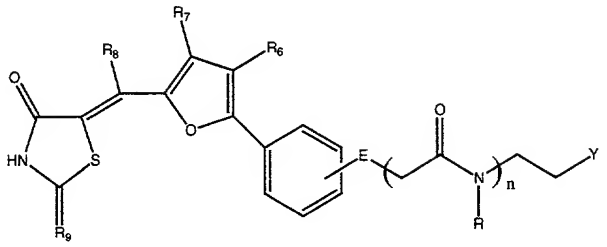
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

80. The combinatorial library of claim 69, having the formula



wherein

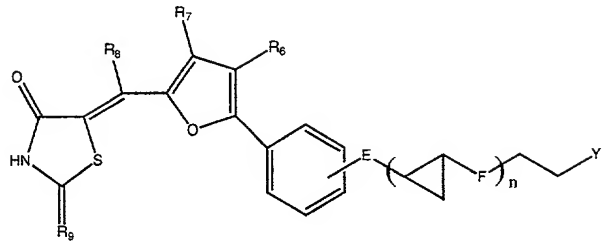
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$;

R is hydrogen, alkyl, alkenyl, alkynyl, aryl, or heterocycle; and

n is an integer between 0 and 5, inclusive.

81. The combinatorial library of claim 69, having the formula



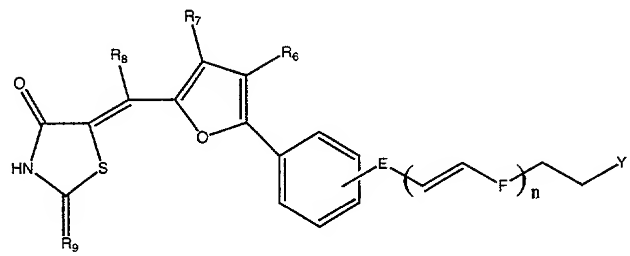
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

82. The combinatorial library of claim 69, having the formula



wherein

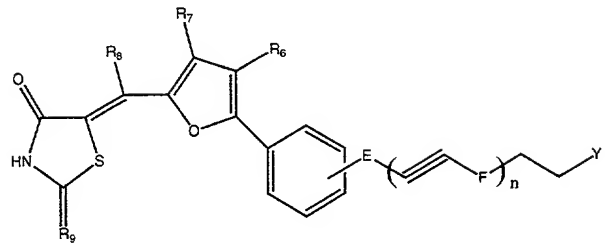
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

83. The combinatorial library of claim 69, having the formula



wherein

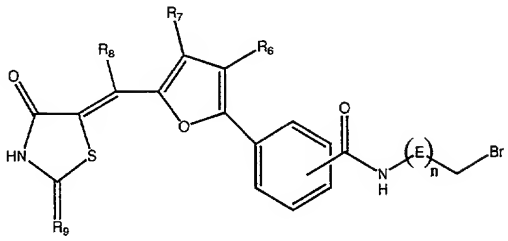
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

84. The combinatorial library of claim 69, having the formula

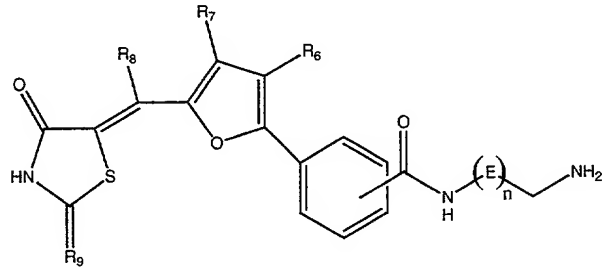


wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH; and

n is an integer between 0 and 5, inclusive.

85. The combinatorial library of claim 69, having the formula

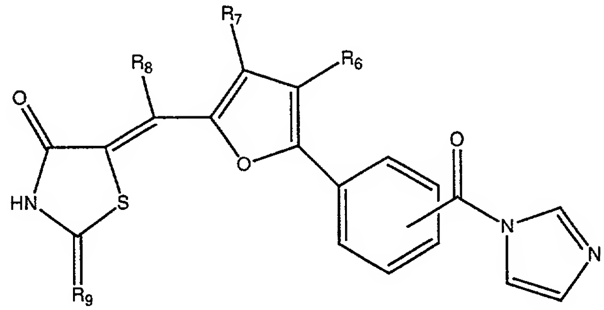


wherein

E is CH_2, CH_2CH_2OCH or CH_2CH_2SCH and n is an integer between 1 and 10, inclusive.

86. The combinatorial library of claim 85, wherein n is greater than 4 and E is CH_2CH_2OCH or CH_2CH_2SCH.

87. The combinatorial library of claim 69, having the formula



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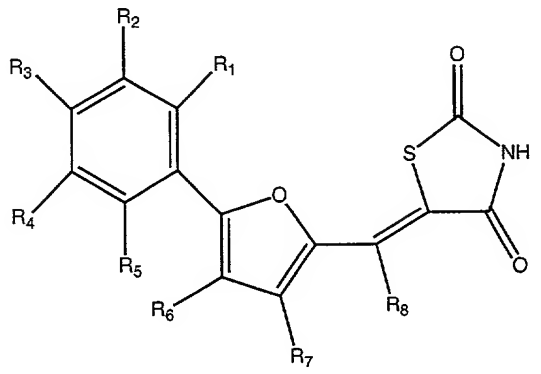
88. A combinatorial library of two or more compounds comprising a common ligand variant of a compound of the formula:



wherein

R_1 to R_8 each independently are selected from the group consisting of H, alkyl, alkenyl, alkynyl, aryl, heterocycle, COOH, COOAlkyl, $CONR_{10}R_{11}$, $C(O)R_{12}$, OH, OAlkyl, OAc, SH, SR_{12}, SO_3H, $S(O)R_{12}$, $SO_2NR_{10}R_{11}$, $S(O)_2R_{12}$, NH_2, NHR_{12}, $NR_{10}R_{11}$, $NHCOR_{12}$, N_3, NO_2, PH_3, PH_2R_{12}, H_2PO_4, H_2PO_3, H_2PO_2, HPO_4R_{12}, $PO_2R_{11}R_{12}$, CN, and X;

R_{10}, R_{11}, and R_{12} each independently are selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, aryl, and heterocycle, or R_{10} and R_{11} together with the nitrogen to which they are attached can be joined to form a heterocyclic ring.

89. The combinatorial library of claim 88, wherein at least one of R_1 to R_8 is COOH.

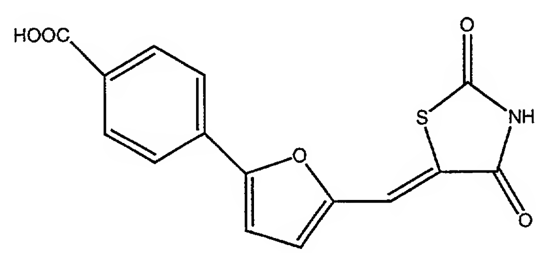
90. The combinatorial library of claim 88, wherein at least one of R_1 to R_8 is OH.

91. The combinatorial library of claim 88, wherein at least one of R_1 to R_8 is COOAlkyl.

92. The combinatorial library of claim 88, wherein at least one of R_1 to R_8 is OAlkyl.

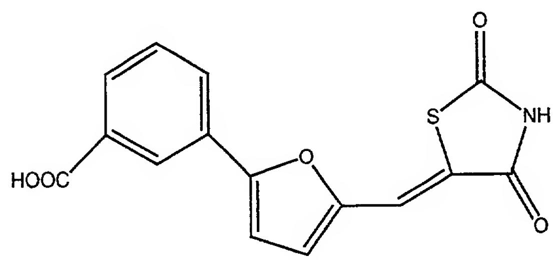
93. The combinatorial library of claim 88, wherein two or more of R_1 to R_8 are substituted.

94. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



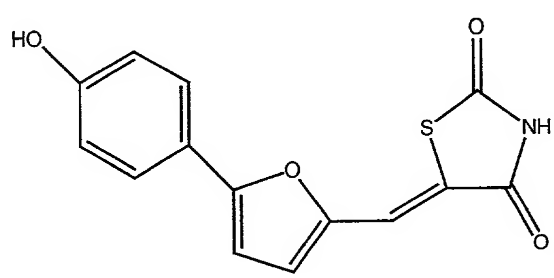
.

95. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



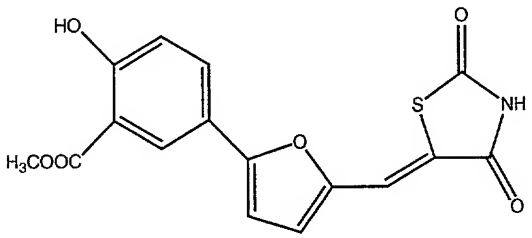
.

96. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:

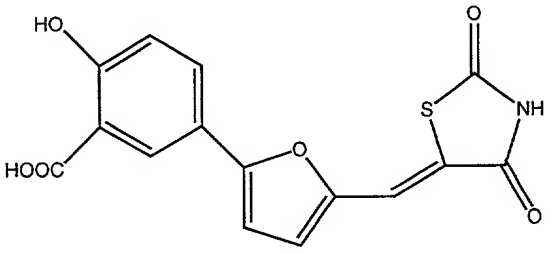


.

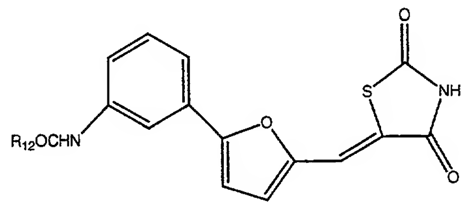
97. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



98. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:

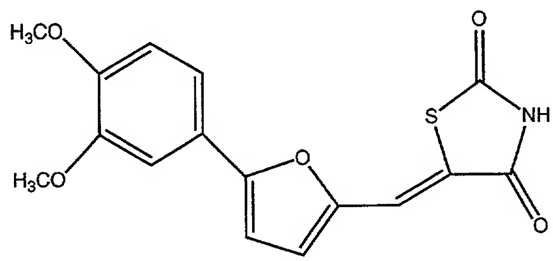


99. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



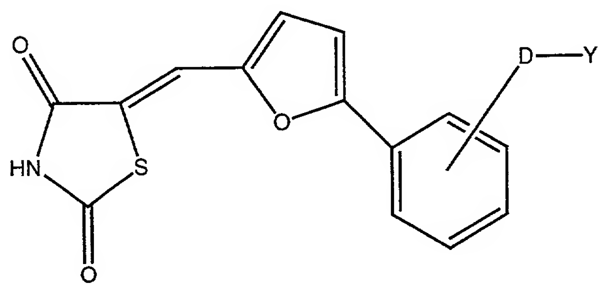
.

100. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



.

101. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:

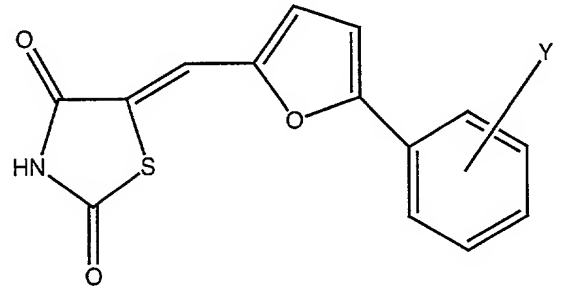


wherein

D is alkylene, alkenylene, alkynylene, aryl, or heterocycle; and

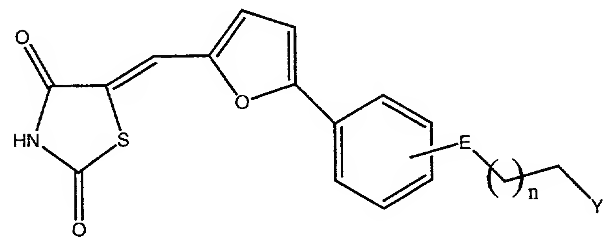
Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

102. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

103. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



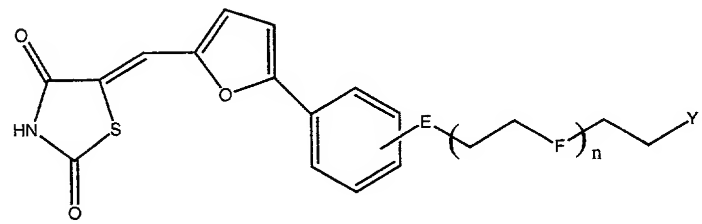
wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

104. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



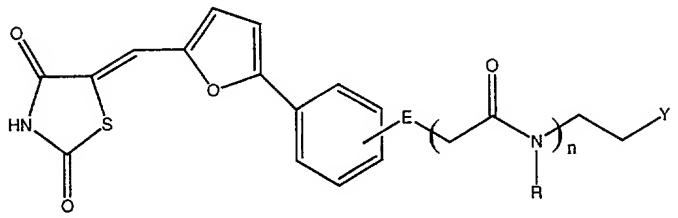
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

105. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein

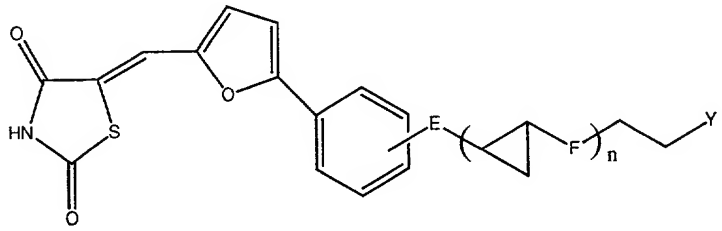
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$;

R is hydrogen, alkyl, alkenyl, alkynyl, aryl, or heterocycle; and

n is an integer between 0 and 5, inclusive.

106. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



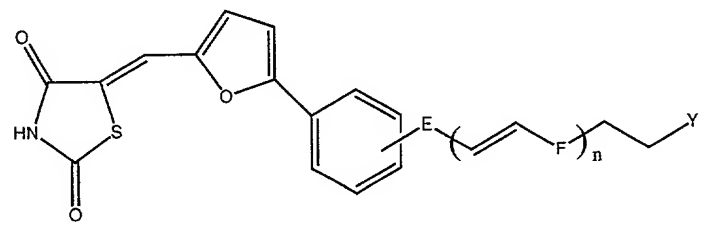
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

107. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein

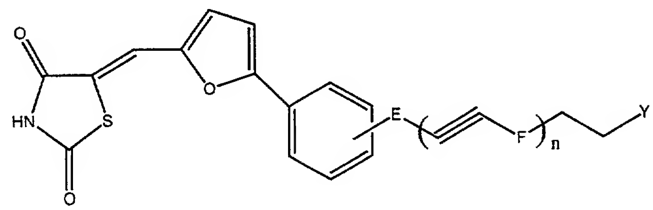
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

108. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein

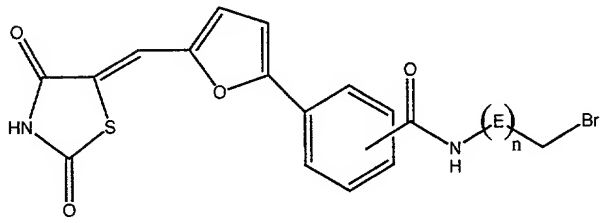
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

109. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:

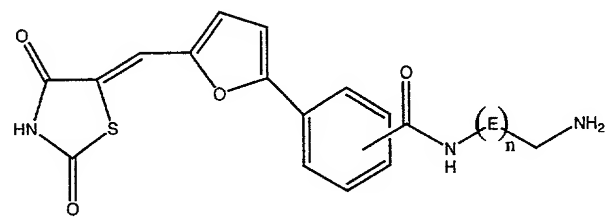


wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH; and

n is an integer between 0 and 5, inclusive.

110. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



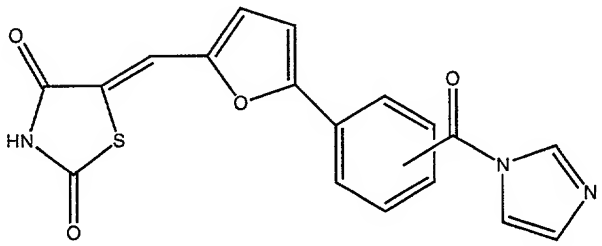
wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH; and

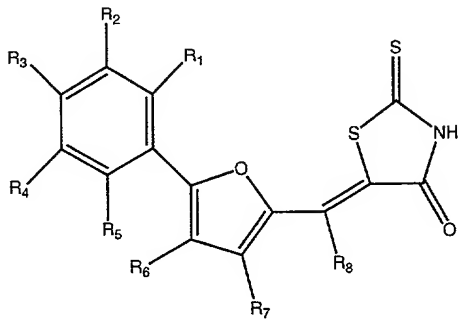
n is an integer between 0 and 5, inclusive.

111. The combinatorial library of claim 110, wherein n is greater than 4 and E is CH_2CH_2OCH or CH_2CH_2SCH.

112. The combinatorial library of claim 88, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



113. A combinatorial library of two or more compounds comprising a common ligand variant of a compound of formula:



wherein

R_1 to R_8 each independently are selected from the group consisting of H, alkyl, alkenyl, alkynyl, aryl, heterocycle, COOH, COOAlkyl, $CONR_{10}R_{11}$, $C(O)R_{12}$, OH, OAlkyl, OAc, SH, SR_{12}, SO_3H, $S(O)R_{12}$, $SO_2NR_{10}R_{11}$, $S(O)_2R_{12}$, NH_2, NHR_{12}, $NR_{10}R_{11}$, $NHCOR_{12}$, N_3, NO_2, PH_3, PH_2R_{12}, H_2PO_4, H_2PO_3, H_2PO_2, HPO_4R_{12}, $PO_2R_{11}R_{12}$, CN, and X;

R_{10}, R_{11}, and R_{12} each independently are selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, aryl, and heterocycle, or R_{10} and R_{11} together with the nitrogen to which they are attached can be joined to form a heterocyclic ring.

114. The combinatorial library of claim 113, wherein at least one of R_1 to R_8 is COOH.

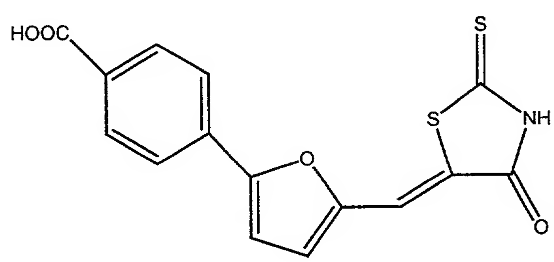
115. The combinatorial library of claim 113, wherein at least one of R_1 to R_8 is OH.

116. The combinatorial library of claim 113, wherein at least one of R_1 to R_8 is OAlkyl.

117. The combinatorial library of claim 113, wherein at least one of R_1 to R_8 is COOAlkyl.

118. The combinatorial library of claim 113, wherein at least one of R_1 to R_8 is $NHCOR_7$.

119. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



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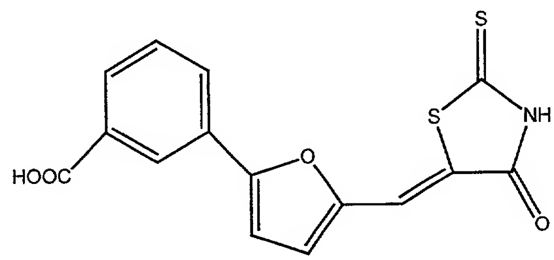
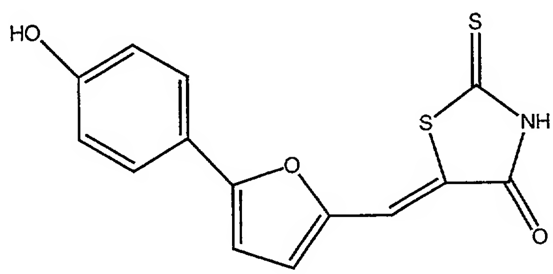
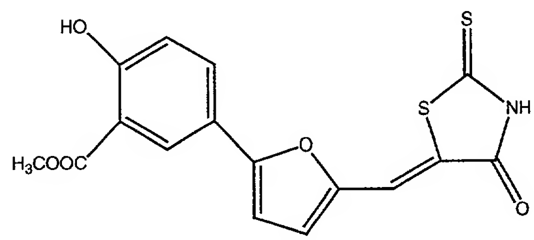
120. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



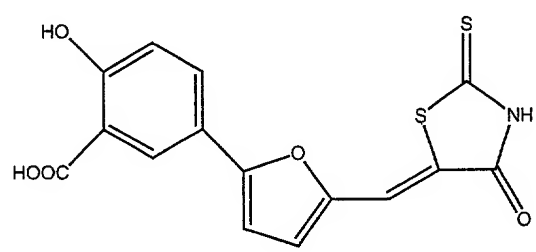
121. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



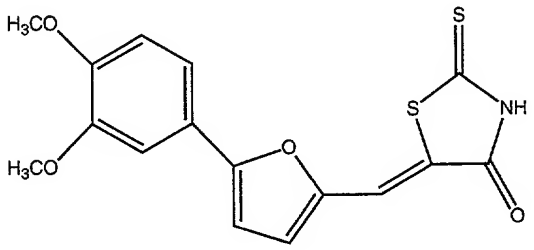
122. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



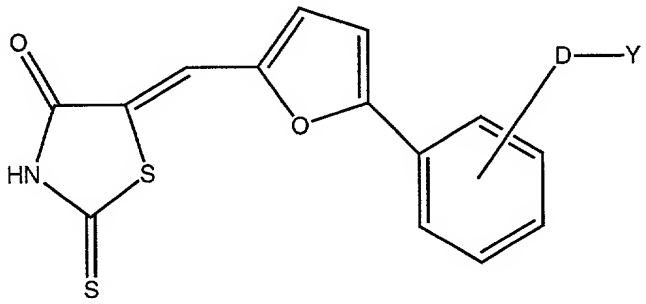
123. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



124. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



125. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:

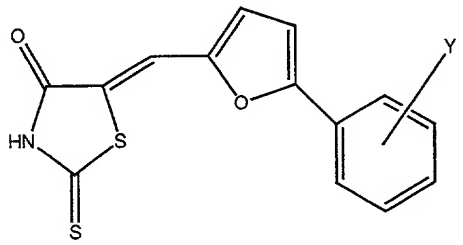


wherein

D is alkylene, alkenylene, alkynylene, aryl, or heterocycle; and

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

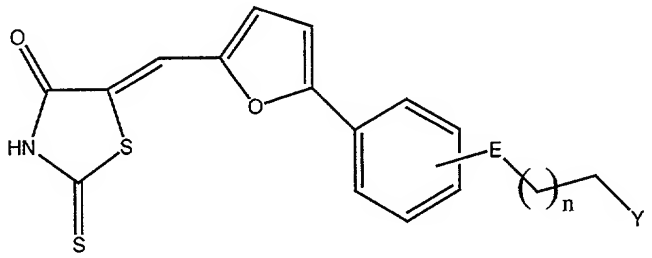
126. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



wherein

wherein Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONH_2$, C≡CH, or $CH=CH_2$.

127. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



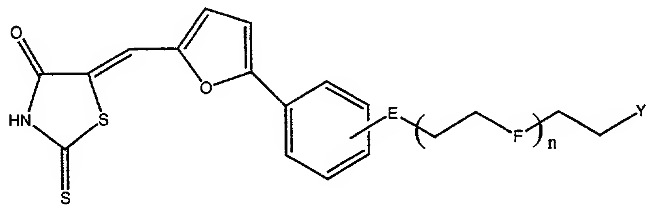
wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONH_2$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

128. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



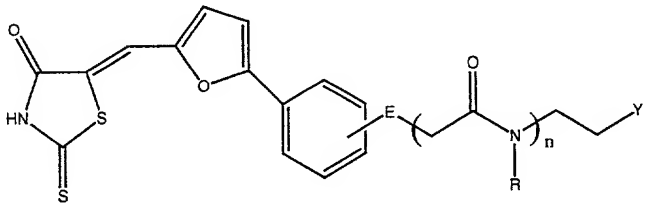
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONH_2$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

129. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



wherein

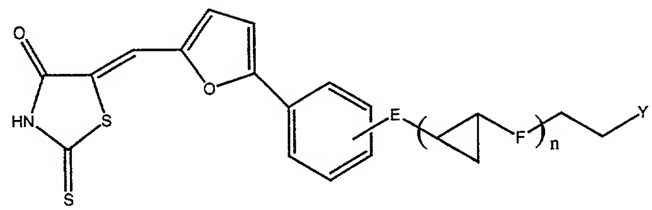
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONH_2$, C≡CH, or $CH=CH_2$;

R is hydrogen, alkyl, alkenyl, alkynyl, aryl, or heterocycle; and

n is an integer between 0 and 5, inclusive.

130. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



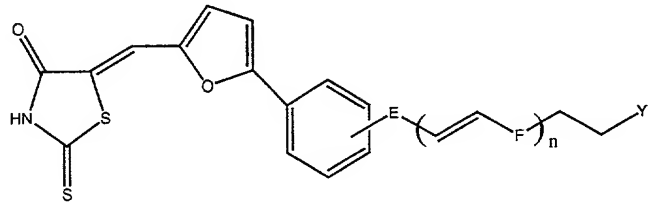
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONH_2$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

131. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



wherein

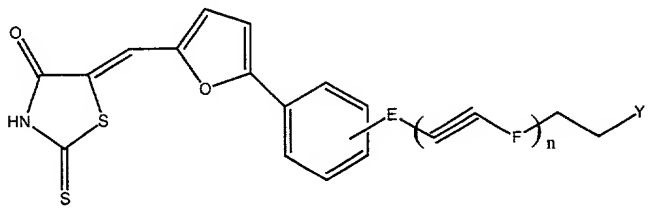
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONH_2$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

132. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



wherein

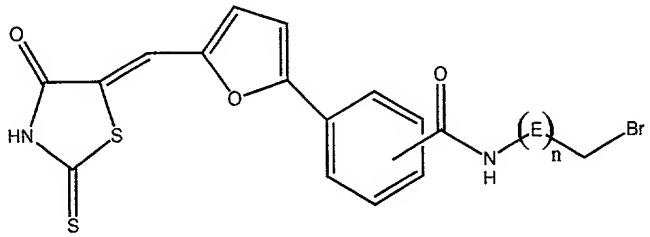
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONH_2$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

133. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:

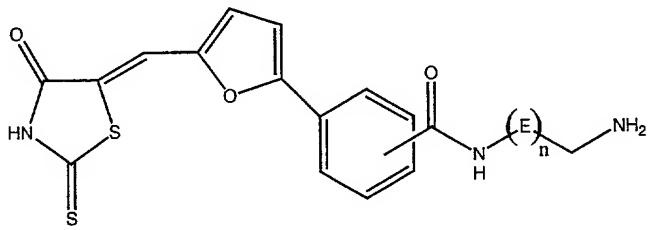


wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH; and

n is an integer between 0 and 5, inclusive.

134. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:

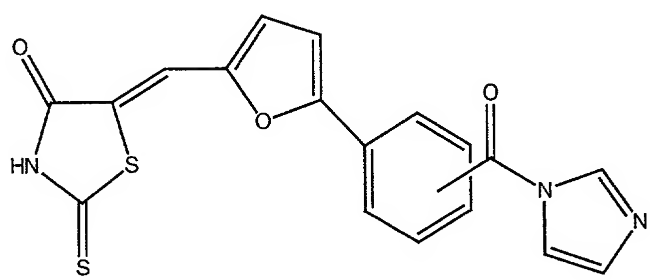


wherein

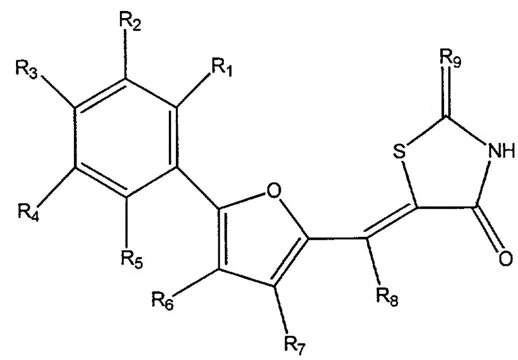
E is CH_2, CH_2CH_2OCH or CH_2CH_2SCH and n is an integer between 1 and 10, inclusive.

135. The combinatorial library of claim 134, wherein n is greater than 4 and E is CH_2CH_2OCH or CH_2CH_2SCH.

136. The combinatorial library of claim 113, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



137. A combinatorial library of two or more bi-ligands comprising the reaction product of a specificity ligand and a common ligand mimic having the formula:



wherein

R_1 to R_8 each independently are selected from the group consisting of H, alkyl, alkenyl, alkynyl, aryl, heterocycle, COOH, COOAlkyl, $CONR_{10}R_{11}$, $C(O)R_{12}$, OH, OAlkyl, OAc, SH, SR_{12}, SO_3H, $S(O)R_{12}$, $SO_2NR_{10}R_{11}$, $S(O)_2R_{12}$, NH_2, NHR_{12}, $NR_{10}R_{11}$, $NHCOR_{12}$, N_3, NO_2, PH_3, PH_2R_{12}, H_2PO_4, H_2PO_3, H_2PO_2, HPO_4R_{12}, $PO_2R_{11}R_{12}$, CN, and X;

R_9 is O, S, or NR_{12}; and

R_{10}, R_{11}, and R_{12} each independently are selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, aryl, and heterocycle, or R_{10} and R_{11} together with the nitrogen to which they are attached can be joined to form a heterocyclic ring.

138. The combinatorial library of claim 137, wherein at least one of R_1 to R_8 is COOH.

139. The combinatorial library of claim 137, wherein at least one of R_1 to R_8 is OH.

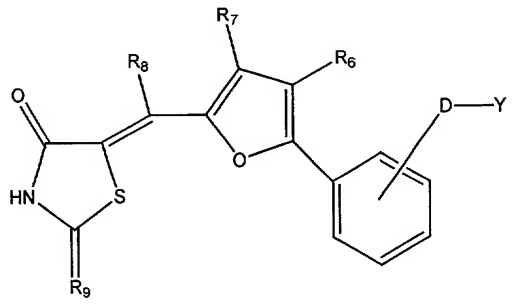
140. The combinatorial library of claim 137, wherein at least one of R_1 to R_8 is OAlkyl.

141. The combinatorial library of claim 137, wherein at least one of R_1 to R_8 is COOAlkyl.

142. The combinatorial library of claim 137, wherein at least one of R_1 to R_8 is $NHCOR_7$.

143. The combinatorial library of claim 137, wherein two or more of R_1 to R_8 are substituted.

144. The combinatorial library of claim 137, wherein at least one of the compounds is a common ligand variant of a compound having the formula:

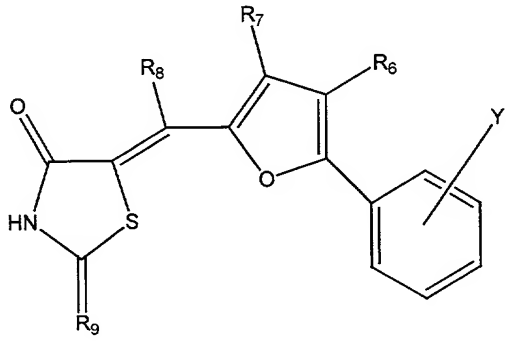


wherein

D is alkylene, alkenylene, alkynylene, aryl, or heterocycle; and

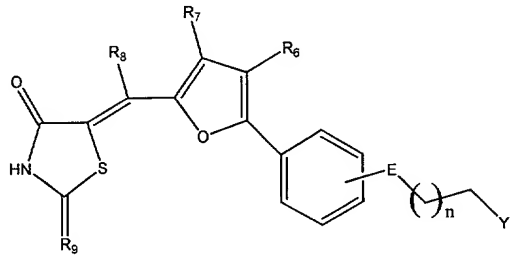
Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

145. The combinatorial library of claim 137, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$,$CONHR_{12}$, C≡CH, or $CH=CH_2$.

146. The combinatorial library of claim 137, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



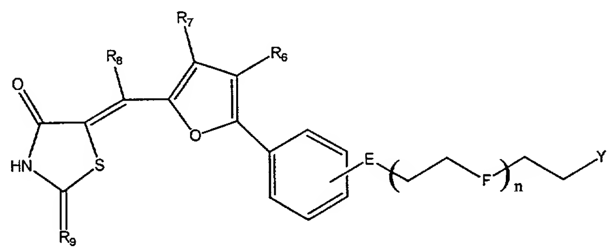
wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

147. The combinatorial library of claim 137, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



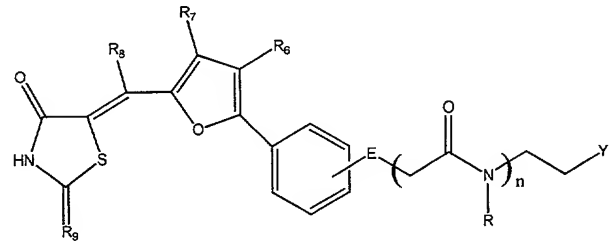
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

148. The combinatorial library of claim 137, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein

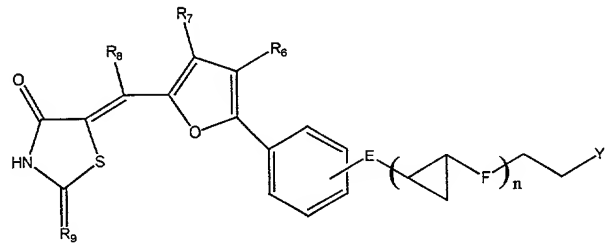
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$;

R is hydrogen, alkyl, alkenyl, alkynyl, aryl, or heterocycle; and

n is an integer between 0 and 5, inclusive.

149. The combinatorial library of claim 137, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



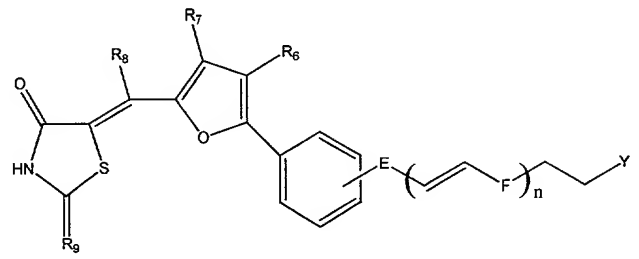
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

150. The combinatorial library of claim 137, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein

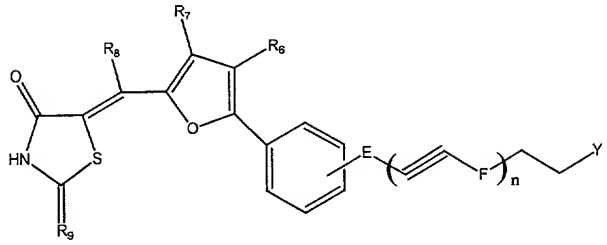
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

151. The combinatorial library of claim 137, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein

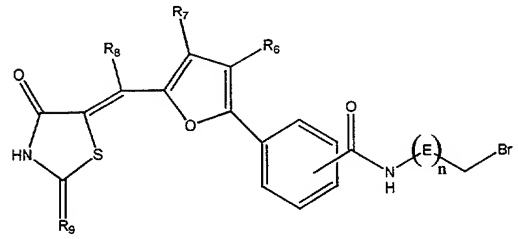
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

152. The combinatorial library of claim 137, wherein at least one of the compounds is a common ligand variant of a compound having the formula:

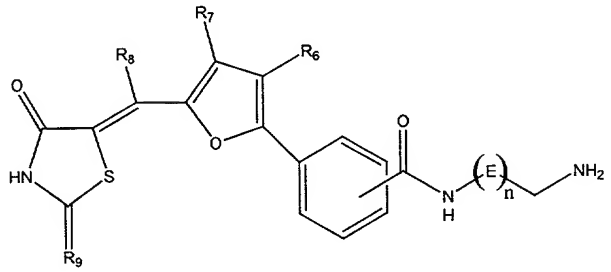


wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH; and

n is an integer between 0 and 5, inclusive.

153. The combinatorial library of claim 137, wherein at least one of the compounds is a common ligand variant of a compound having the formula:

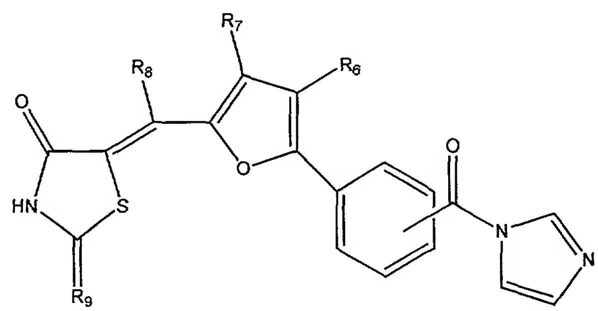


wherein

E is CH_2, CH_2CH_2OCH or CH_2CH_2SCH and n is an integer between 1 and 10, inclusive.

154. The combinatorial library of claim 153, wherein n is greater than 4 and E is CH_2CH_2OCH or CH_2CH_2SCH.

155. The combinatorial library of claim 137, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



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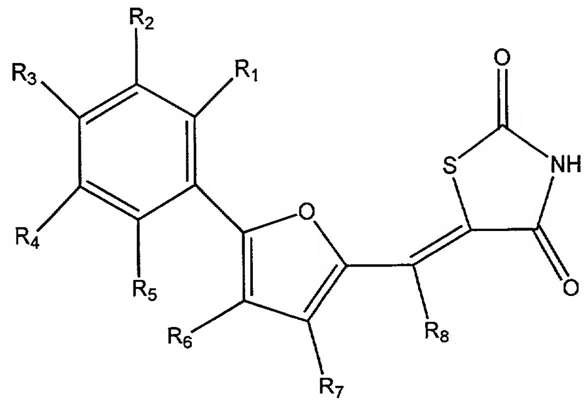
156. A combinatorial library of two or more bi-ligands comprising the reaction product of a specificity ligand and a common ligand mimic having the formula:



wherein

R_1 to R_8 each independently are selected from the group consisting of H, alkyl, alkenyl, alkynyl, aryl, heterocycle, COOH, COOAlkyl, $CONR_{10}R_{11}$, $C(O)R_{12}$, OH, OAlkyl, OAc, SH, SR_{12}, SO_3H, $S(O)R_{12}$, $SO_2NR_{10}R_{11}$, $S(O)_2R_{12}$, NH_2, NHR_{12}, $NR_{10}R_{11}$, $NHCOR_{12}$, N_3, NO_2, PH_3, PH_2R_{12}, H_2PO_4, H_2PO_3, H_2PO_2, HPO_4R_{12}, $PO_2R_{11}R_{12}$, CN, and X;

R_{10}, R_{11}, and R_{12} each independently are selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, aryl, and heterocycle, or R_{10} and R_{11} together with the nitrogen to which they are attached can be joined to form a heterocyclic ring.

157. The combinatorial library of claim 156, wherein at least one of R_1 to R_8 COOH.

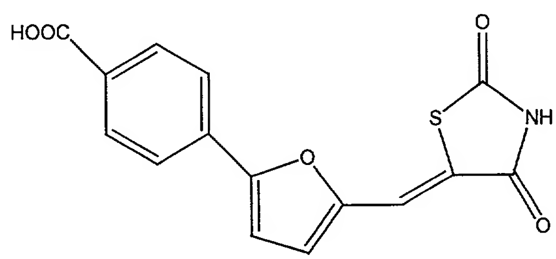
158. The combinatorial library of claim 156, wherein at least one of R_1 to R_8 is OH.

159. The combinatorial library of claim 156, wherein at least one of R_1 to R_8 is COOAlkyl.

160. The combinatorial library of claim 156, wherein at least one of R_1 to R_8 is OAlkyl.

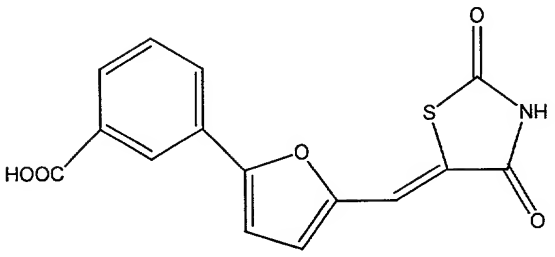
161. The combinatorial library of claim 156, wherein two or more of R_1 to R_8 are substituted.

162. The combinatorial library of claim 156, wherein the common ligand mimic comprises a compound of the formula:

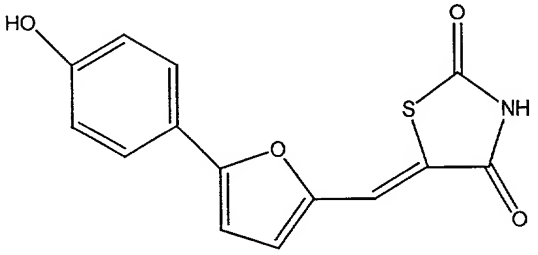


.

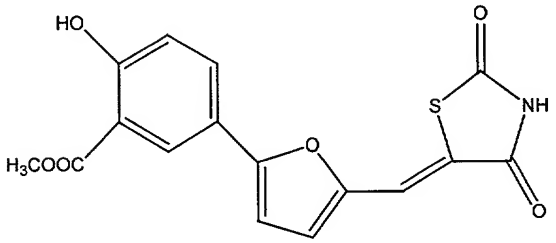
163. The combinatorial library of claim 156, wherein the common ligand mimic comprises a compound of the formula:



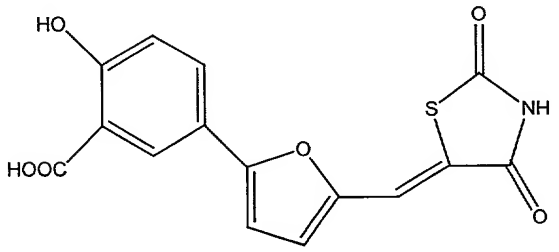
164. The combinatorial library of claim 156, wherein the common ligand mimic comprises a compound of the formula:



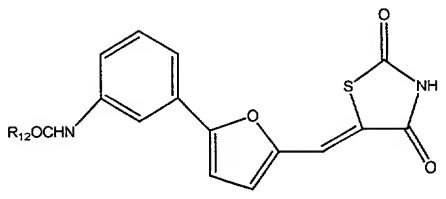
165. The combinatorial library of claim 156, wherein the common ligand mimic comprises a compound of the formula:



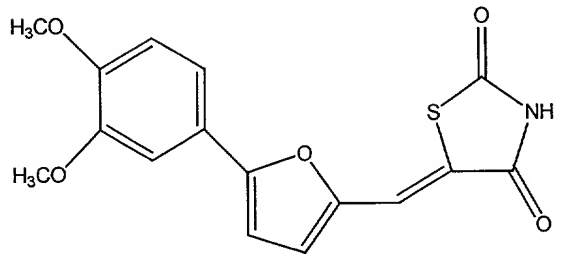
166. The combinatorial library of claim 156, wherein the common ligand mimic comprises a compound of the formula:



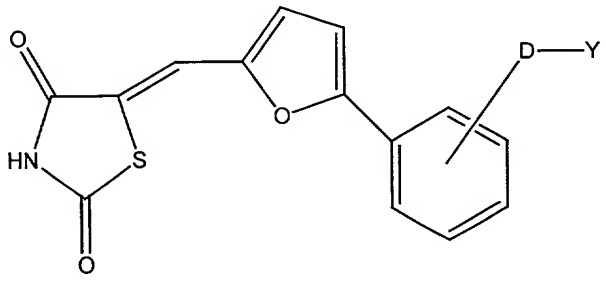
167. The combinatorial library of claim 156, wherein the common ligand mimic comprises a compound of the formula:



168. The combinatorial library of claim 156, wherein the common ligand mimic comprises a compound of the formula:



169. The combinatorial library of claim 156, wherein at least one of the compounds is a common ligand variant of a compound having the formula:

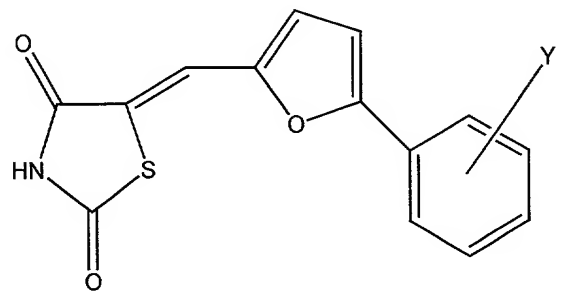


wherein

D is alkylene, alkenylene, alkynylene, aryl, or heterocycle; and

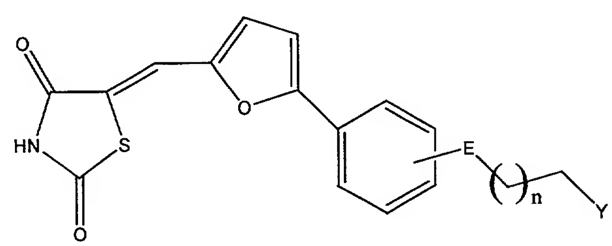
Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, $C\equiv CH$, or $CH=CH_2$.

170. The combinatorial library of claim 156, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH{=}CH_2$.

171. The combinatorial library of claim 156, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



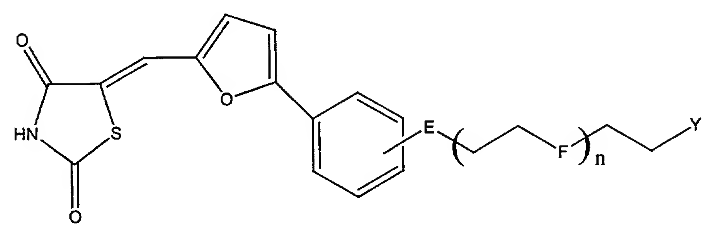
wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

172. The combinatorial library of claim 156, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



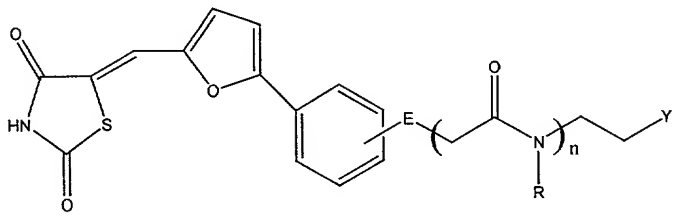
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

173. The combinatorial library of claim 156, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



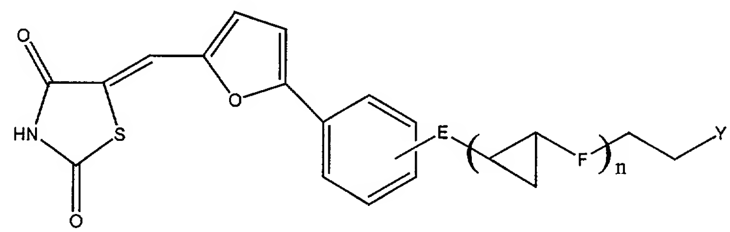
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

R is hydrogen, alkyl, alkenyl, alkynyl, aryl, or heterocycle; and

n is an integer between 0 and 5, inclusive.

174. The combinatorial library of claim 156, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



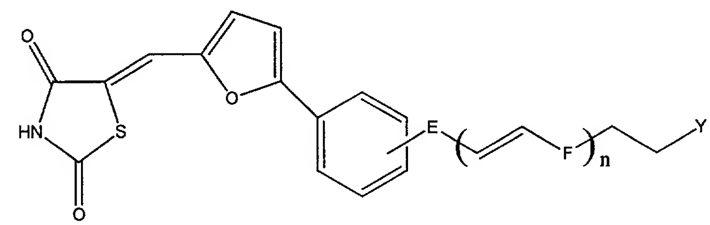
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

175. The combinatorial library of claim 156, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein

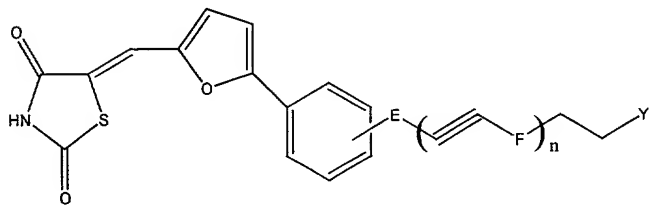
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

176. The combinatorial library of claim 156, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein

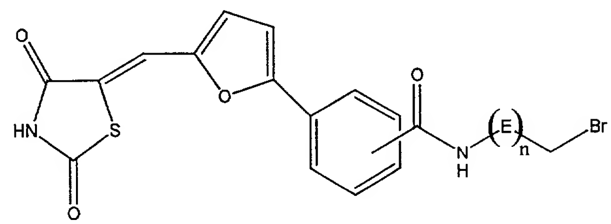
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

177. The combinatorial library of claim 156, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



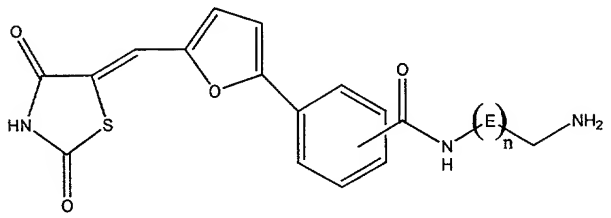
wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

and

n is an integer between 0 and 5, inclusive.

178. The combinatorial library of claim 156, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

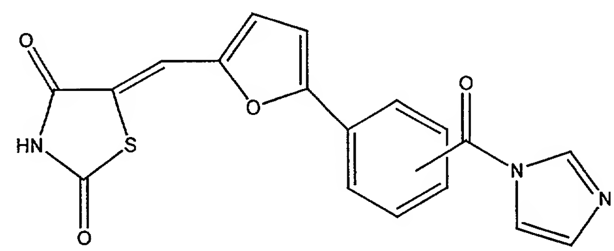
F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

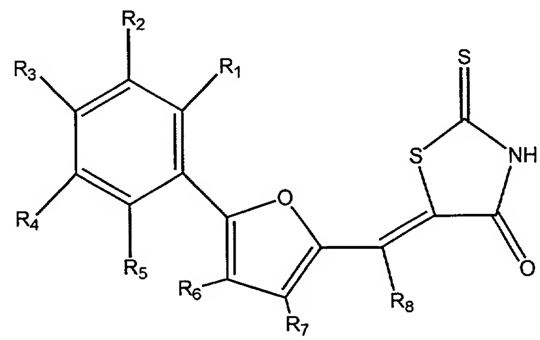
n is an integer between 0 and 5, inclusive.

179. The combinatorial library of claim 178, wherein n is greater than 4 and E is CH_2CH_2OCH or CH_2CH_2SCH.

180. The combinatorial library of claim 156, wherein at least one of the compounds is a common ligand variant of a compound having the formula:



181. A combinatorial library of two or more bi-ligands comprising the reaction product of a specificity ligand and a common ligand mimic having the formula:



wherein

R_1 to R_8 each independently are selected from the group consisting of H, alkyl, alkenyl, alkynyl, aryl, heterocycle, COOH, COOAlkyl, $CONR_{10}R_{11}$, $C(O)R_{12}$, OH, OAlkyl, OAc, SH, SR_{12}, SO_3H, $S(O)R_{12}$, $SO_2NR_{10}R_{11}$, $S(O)_2R_{12}$, NH_2, NHR_{12}, $NR_{10}R_{11}$, $NHCOR_{12}$, N_3, NO_2, PH_3, PH_2R_{12}, H_2PO_4, H_2PO_3, H_2PO_2, HPO_4R_{12}, $PO_2R_{11}R_{12}$, CN, and X;

R_{10}, R_{11}, and R_{12} each independently are selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, aryl, and heterocycle, or R_{10} and R_{11} together with the nitrogen to which they are attached can be joined to form a heterocyclic ring.

182. The combinatorial library of claim 181, wherein at least one of R_1 to R_8 is COOH.

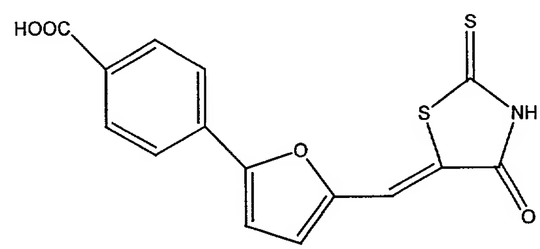
183. The combinatorial library of claim 181, wherein at least one of R_1 to R_8 is OH.

184. The combinatorial library of claim 181, wherein at least one of R_1 to R_8 is OAlkyl.

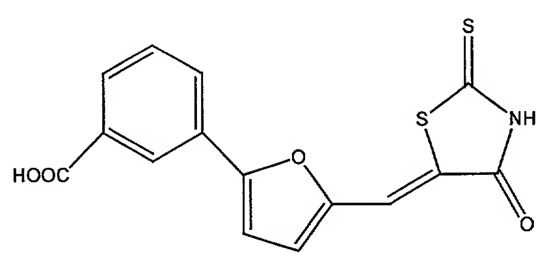
185. The combinatorial library of claim 181, wherein at least one of R_1 to R_8 is COOAlkyl.

186. The combinatorial library of claim 181, wherein at least one of R_1 to R_8 is $NHCOR_7$.

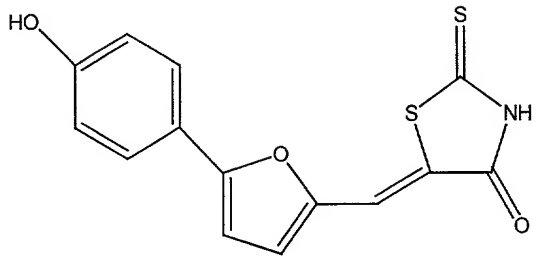
187. The combinatorial library of claim 181, wherein the common ligand mimic comprises a compound of the formula:



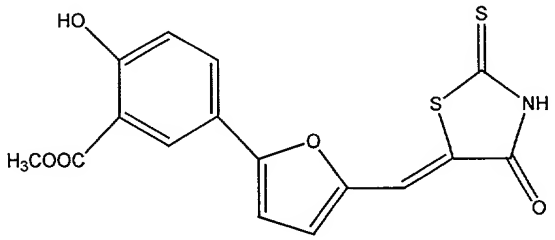
188. The combinatorial library of claim 181, wherein the common ligand mimic comprises a compound of the formula:



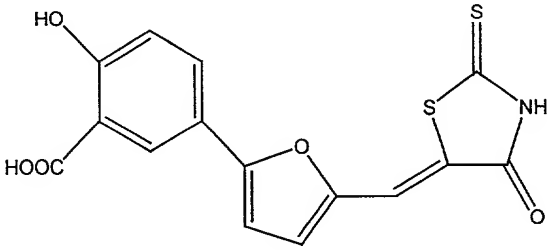
189. The combinatorial library of claim 181, wherein the common ligand mimic comprises a compound of the formula:



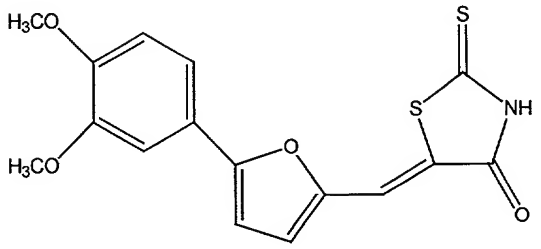
190. The combinatorial library of claim 181, wherein the common ligand mimic comprises a compound of the formula:



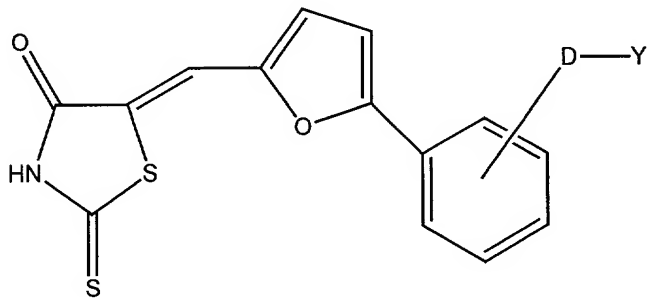
191. The combinatorial library of claim 181, wherein the common ligand mimic comprises a compound of the formula:



192. The combinatorial library of claim 181, wherein the common ligand mimic comprises a compound of the formula:



193. The combinatorial library of claim 181, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:

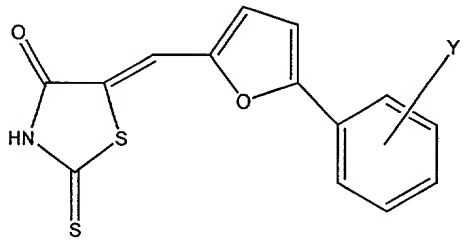


wherein

D is alkylene, alenylene, alkynylene, aryl, or heterocycle; and

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, $C{\equiv}CH$, or $CH{=}CH_2$.

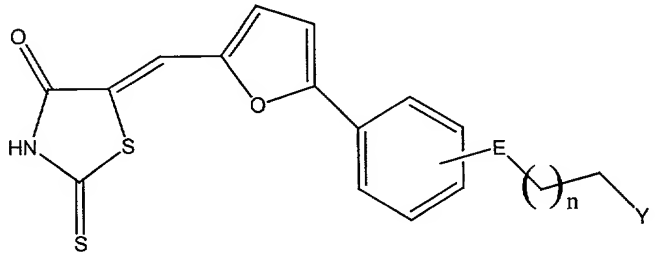
194. The combinatorial library of claim 181, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



wherein

wherein Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$.

195. The combinatorial library of claim 181, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



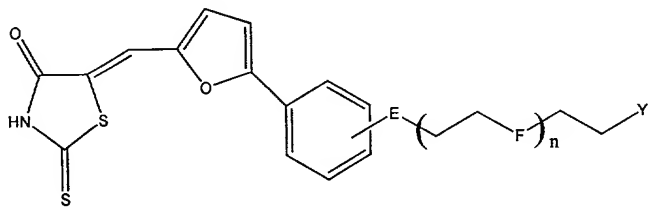
wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

196. The combinatorial library of claim 181, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



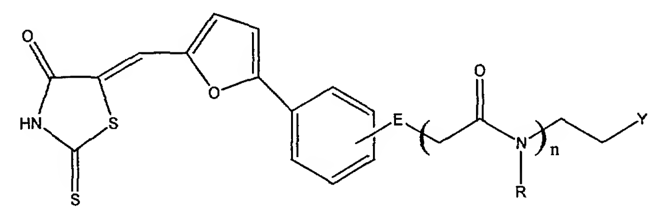
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

197. The combinatorial library of claim 181, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



wherein

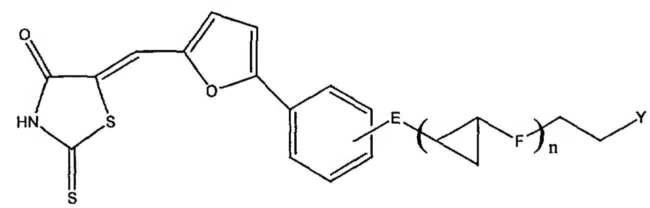
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$;

R is hydrogen, alkyl, alkenyl, alkynyl, aryl, or heterocycle; and

n is an integer between 0 and 5, inclusive.

198. The combinatorial library of claim 181, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



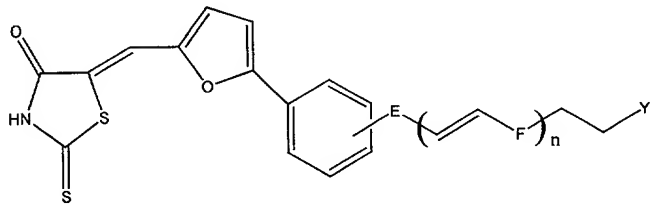
wherein

E and F each independently are selected from the group consisting of O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

199. The combinatorial library of claim 181, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



wherein

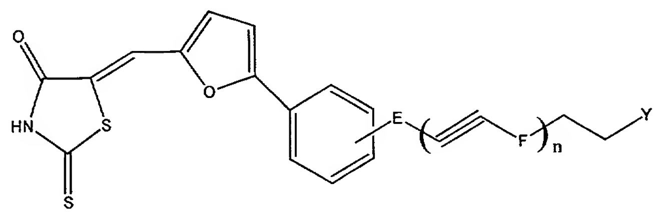
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

200. The combinatorial library of claim 181, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



wherein

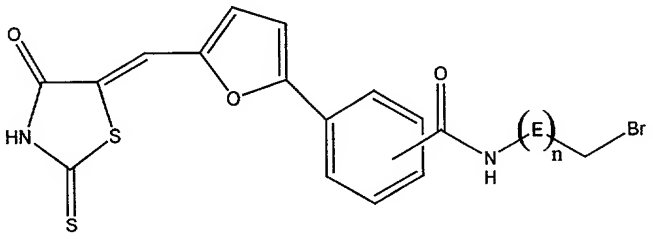
E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH;

F independently is selected from the group consisting of O, S, NR_{12}, $CR_{11}R_{12}$, $CONR_{12}$, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C=C, and CH=CH;

Y is OH, NHR_{12}, SH, COOH, SO_2OH, X, CN, N_3, $CONH_2$, $CONHR_{12}$, C≡CH, or $CH=CH_2$; and

n is an integer between 0 and 5, inclusive.

201. The combinatorial library of claim 181, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:

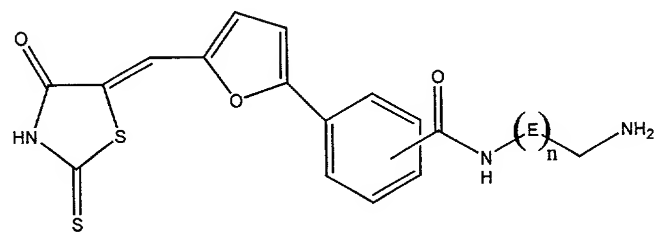


wherein

E is O, S, NR_{12}, $CR_{11}C_{12}$, $CONR_{12}$, SO_2NR_{12}, $NR_{11}CONR_{12}$, $NR_{11}CNHNR_{12}$, $NR_{12}COO$, C≡C, or CH=CH; and

n is an integer between 0 and 5, inclusive.

202. The combinatorial library of claim 181, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula:



wherein

E is CH_2, CH_2CH_2OCH or CH_2CH_2SCH and n is an integer between 1 and 10, inclusive.

203. The combinatorial library of claim 202, wherein n is greater than 4 and E is CH_2CH_2OCH or CH_2CH_2SCH.

204. The combinatorial library of claim 181, wherein at least one of the compounds in the library is a common ligand variant of a compound having the formula: